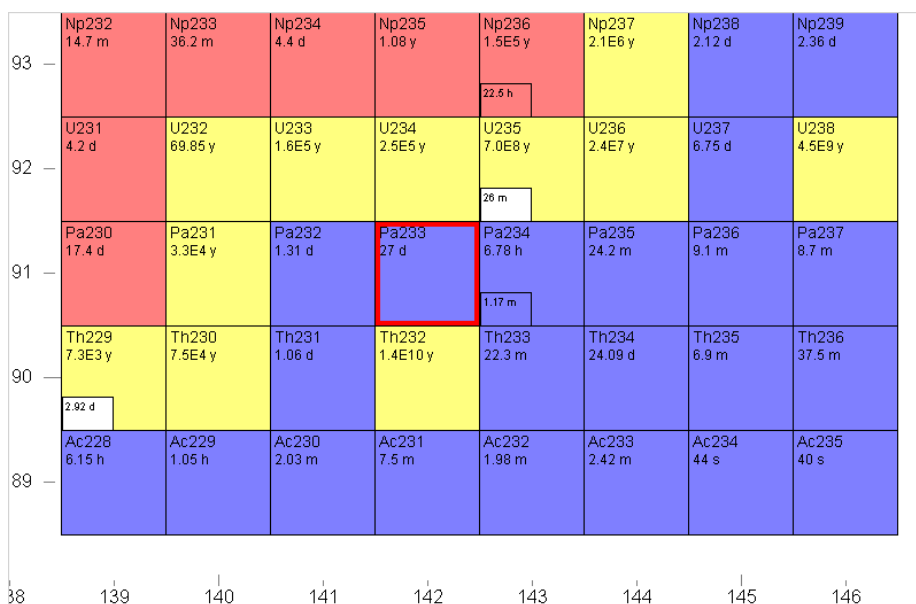


Nuclear Forensics Exercises

(K.Mayer)

Exercises

- After a seizure of radioactive material, the measurement team on site reports to you the detection of a gamma emitter. The energies measured at 300 keV and 312 keV point at Pa-233. What is the material you suspect inside the container?



- If you want to determine the age of a plutonium sample, which parent/daughter pairs can you use in principle?
 - Assume an age of 10 years and an initial isotopic composition of the plutonium of
 - 1.3 atom % Pu-238
 - 59.7 atom % Pu-239
 - 28.2 atom % Pu-240
 - 5.3 % atom Pu-241
 - 5.5 % atom Pu-242

How much of each daughter nuclide (relevant for age determination) is produced during this period in a sample of 1 g Pu?

- What will be the gamma dose rate you measure for the 1g sample (10 years old) outside a lead container of 1 cm wall thickness and a detector-source distance of 1 m?